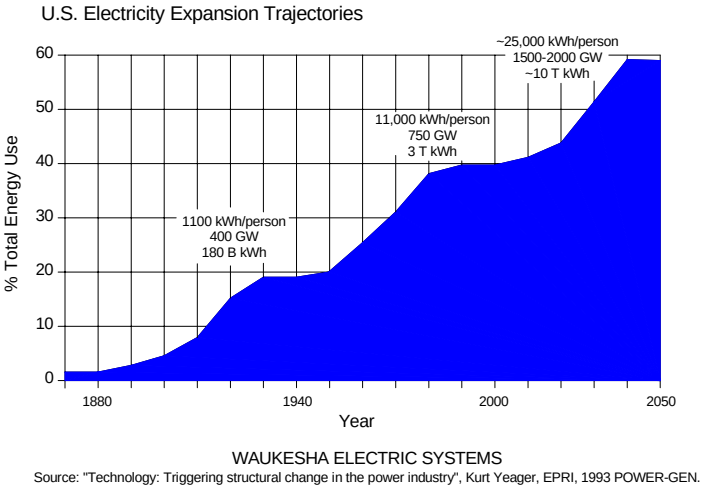
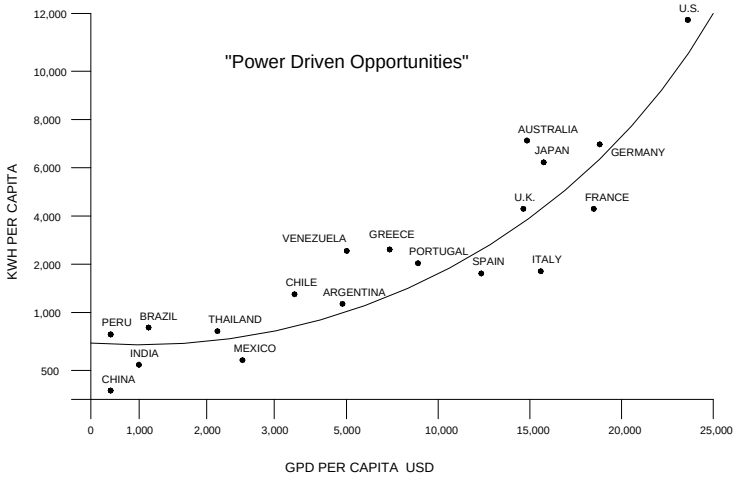
"Future of Electric Power Industry is Bright"

- Electricity is preferred form of energy
- Economic growth driven by electric power





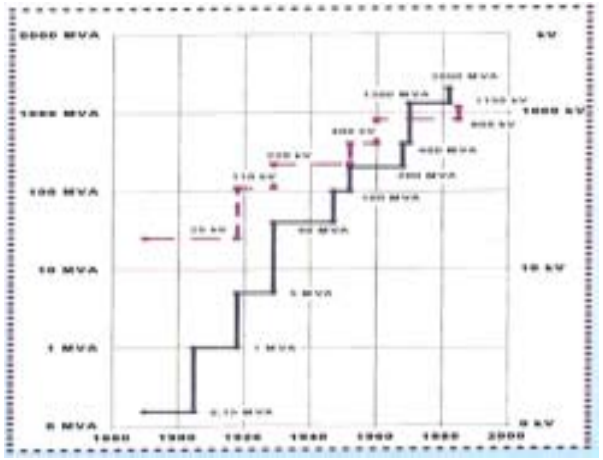
"Present" is Challenging

- **Deregulation - Asset Management - Ageing infrastructure**
- **Decline of knowledge base**
- **Reduced R & D spending**
- **Global competition/National security issues**

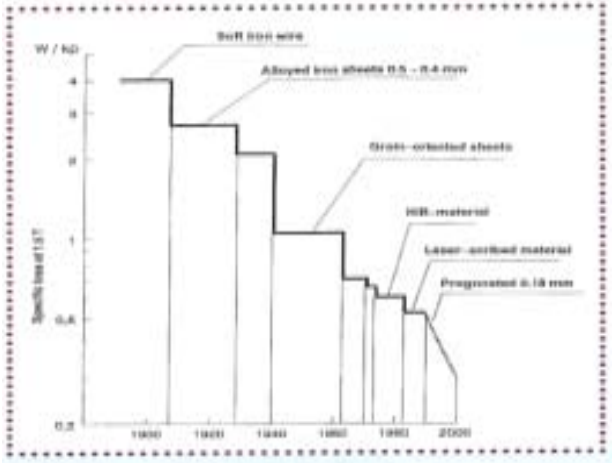
Power Transformers are Continuously Improving Mature Concept

- Improvements based on small incremental advancements in Materials, Analytical Tools, Processing & Fabrication

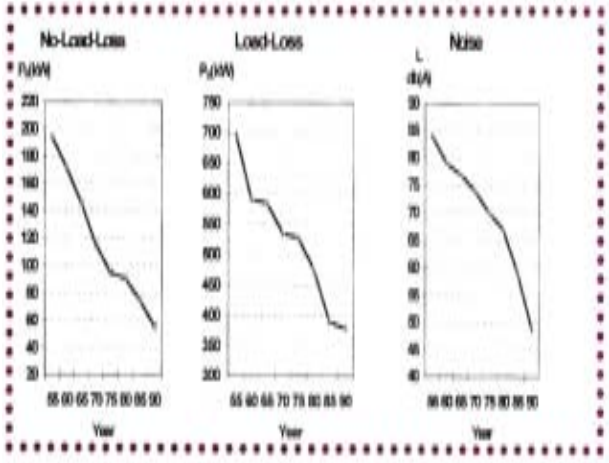
Development of Rated Voltage and Power



Historical review of core steel development

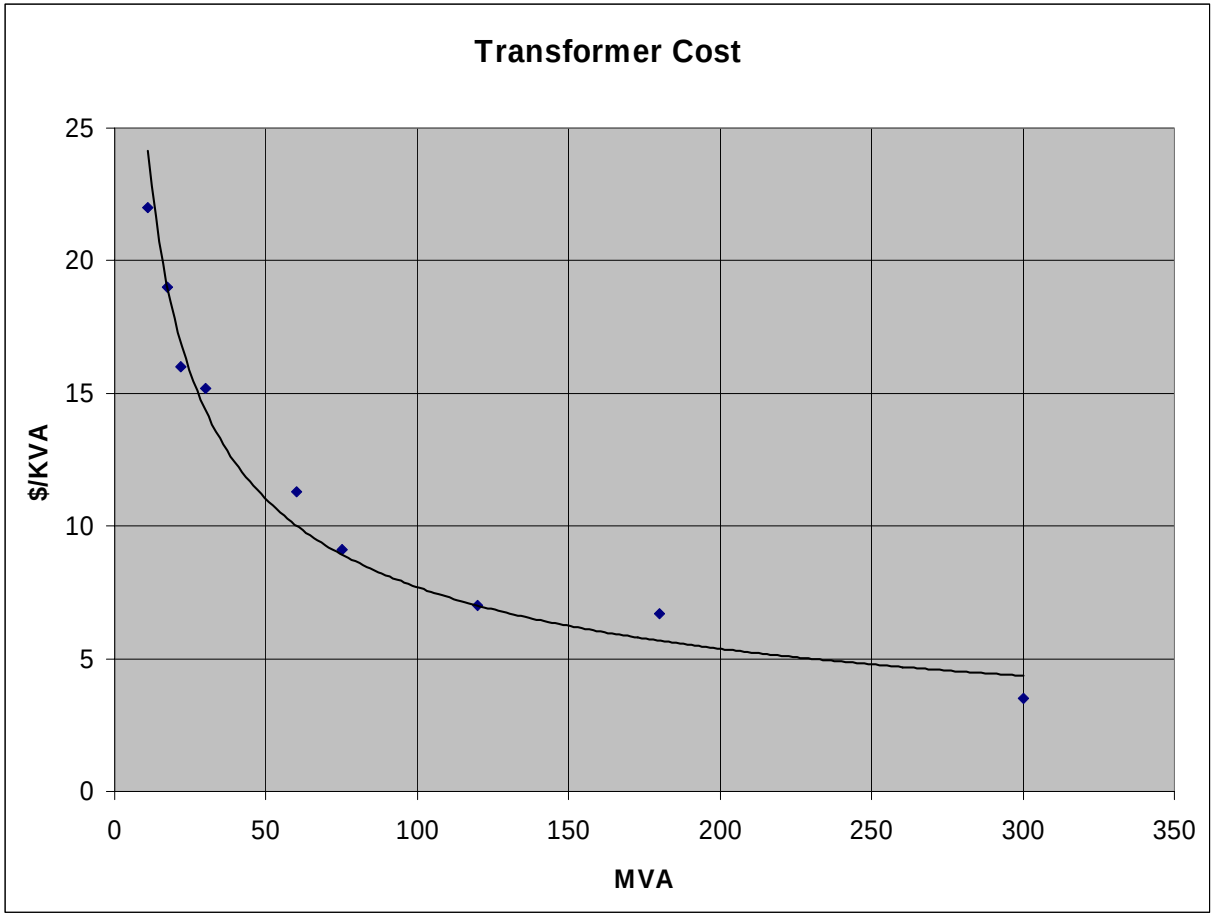


Change of characteristics with time



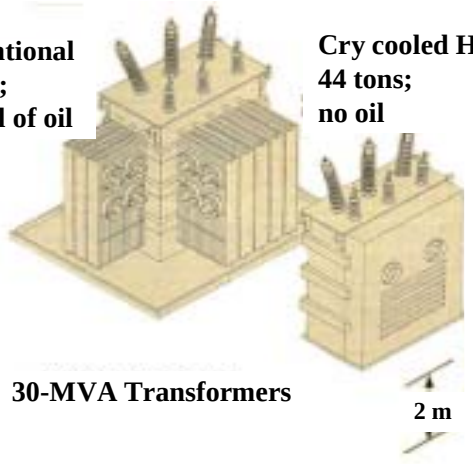
Example: 200 MVA/220 kV Transformer

Price levels of transformers same as 1960's



HTS Transformers offer economic, operational, and environmental advantages.

- Higher efficiency.
- 2X rating overload capability without insulation damage or loss of life.
- Lower impedance and better voltage regulation.
- Potential for fault current limiting capability, allowing reduced cost for associated switchgear, breakers, etc.
- Siting advantages, indoors or outdoors and lower environmental hazard due to lack of oil.
- Lighter and more compact than conventional units.
- Greater security– smaller radiators; can interface directly with underground SC cable; no oil to spill or ignite.



Source: 2004 Peer Review